September 2008 Climate Narrative
For Southwest Lower Michigan

By Nathan Jeruzal

Overview

September 2008 will be remembered as a very wet month for Southwest Lower Michigan. After a dry month of August in which a good portion of the area was classified as "abnormally dry", or the beginning stage of drought, September marked a significant change beginning on the third of the month.

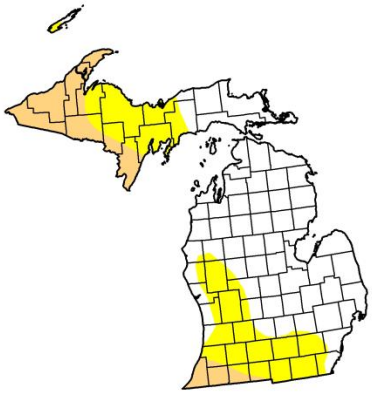

Figure 1. Drought Monitor issued on 9/2/2008
Yellow shading is D0 category, or abnormally dry

On the 3rd, a cold front moved into the area, bringing a few showers and thunderstorms to the area. This front stalled out just south of the state late on the 3rd, and early on the 4th. The remnants of Hurricane Gustav, which came ashore on the Louisiana coast on the morning of the 1st, weakened and moved north along the front. Heavy rains associated with the remnant low and rich moisture occurred across Lower Michigan from the morning of the 4th, through the pre-dawn hours of the 5th. Rainfall amounts ranged from an inch or less southeast of a Battle Creek to Alma line, to a widespread 2 to 4 inches of rainfall northwest of a South Haven to Alma line. Remarkably, no flooding occurred with this event, likely due to the very dry conditions for most of July and August.

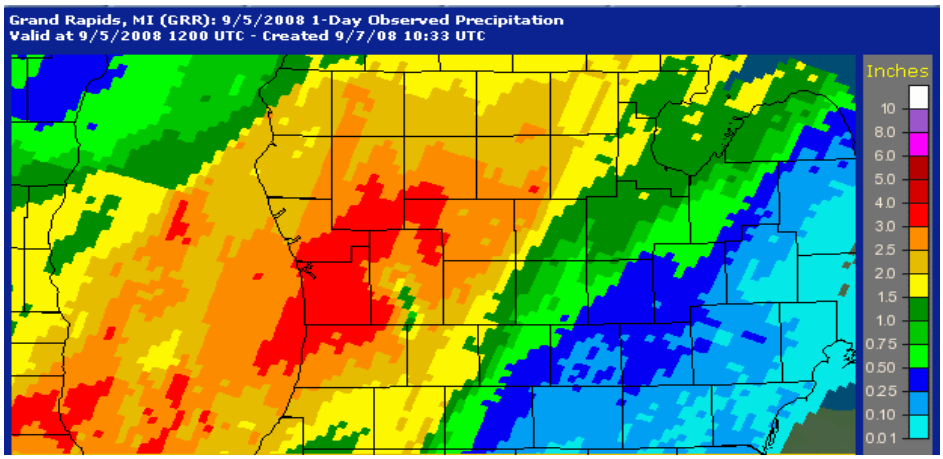

Figure 2. 24 hour Doppler radar estimated rainfall from 8 am 9/4/08 to 8 am 9/5/08

A front moved into the area during the morning hours of Sunday the 7th. This front brought up to a quarter of an inch of rainfall over most of the southern half of the forecast area. A wave of low pressure also moved across the area during the afternoon and evening hours on the 8th. This wave brought a quarter of an inch or rain to the northern counties, while areas south of Interstate 96 saw over an inch of rainfall.

The most notable period of weather for September then came from the Friday night the 12th, through Sunday afternoon the 14th. A cold front dropped down into the area during the day on Friday the 12th. This front stalled out just south of the area late on the 12th. A rich plume of moisture coming from the tropical Pacific moved in along this front, including some mid and high level moisture from former Tropical Storm Lowell. This combined with moisture streaming north from the Gulf of Mexico provided moderate to locally heavy rain through Saturday night the 13th. Most locations south of Interstate 96 saw 2 to 4 inches of rain, while some local areas south of a Holland to Lansing line saw 6 inches of rainfall. This rainfall, combined with the higher rainfall amounts from the previous two weeks began to produce some areal flooding and washouts of roads beginning during the evening hours of Saturday the 13th.

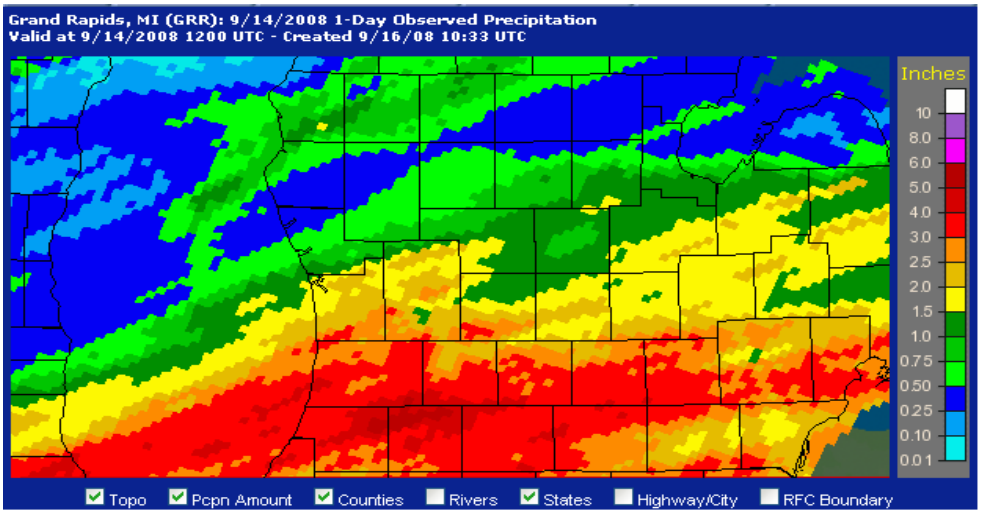

Figure 3. 24 hour Doppler radar estimated rainfall from 8 am 9/13/08 to 8 am 9/14/08

In addition to the heavy rains on the 13th, four tornadoes occurred during the late afternoon/early evening hours. These tornadoes were the only severe weather that occurred during the month. The first tornado occurred in the city of Paw Paw. Damage occurred to a few businesses in Paw Paw, along with some trees knocked down. This tornado was rated EF-1 on the Enhanced Fujita scale with estimated winds of 90 mph. EF-0 tornadoes occurred in far eastern Van Buren county, and far western Kalamazoo county from the same thunderstorm. The same thunderstorm continued through Eaton County where it dropped one more tornado just east of Olivet. This tornado was rated EF-1, and did some damage to a corn field, a few trees, and to a couple of houses.

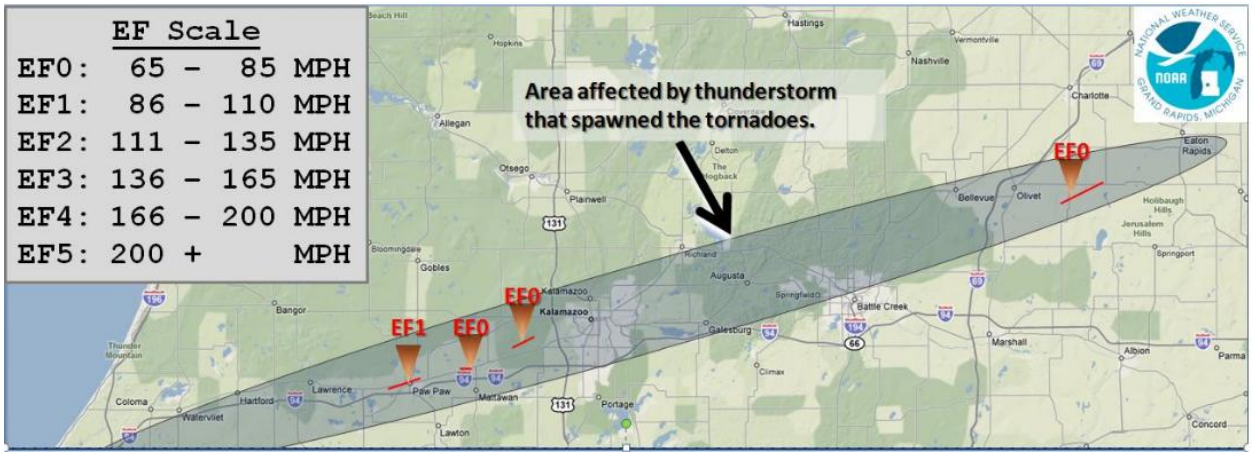

Figure 4. Summary map of the tornado outbreak from Saturday, September 13th.

The front remained near the area through the day of Sunday the 14th. The remnants of Hurricane Ike which came ashore over Galveston, TX, raced northeast along the front, and right across Southern Lower Michigan on the afternoon of the 14th. This brought another 2 to 3 inches of rainfall southeast of a line from Holland to Alma, on top of the heavy rainfall from the day before. The total rainfall from Friday night the 12th through Sunday the 14th was in excess of 10 inches near the Kalamazoo and Battle Creek areas. This heavy rainfall brought a good deal of flooding in the Kalamazoo River basin, and to portions of the Grand River basin toward Lansing. The worst flooding occurred near Comstock in Kalamazoo County where the river rose to 10.43 feet, the third highest crest on record. Many homes and businesses downstream were flooded. Many roads in the city of Kalamazoo were closed for a few days due to high water. There was concern that the 105 year old Plainwell dam was going to be breached. The dam held with no big problems. A small dam did end up breaking in Van Buren County, but no effects were felt as a result.

After the significant amount of rain in the first half of the month, a much needed dry period then occurred from the 16th through 28th. No precipitation occurred as a strong ridge of high pressure brought warm and dry conditions to the area. This allowed area streams and rivers to recover from the heavy rainfall. A front then moved into the area for the 29th and 30th to finish out the wet month with up to an additional inch of rainfall.

Many daily records fell during the two heavy rainfall events during the month. This combined to produce a couple all time monthly records. Battle Creek with 12.00 inches total for the month, ended up with the highest monthly precipitation total for any month going back to 1895. Kalamazoo has limited historical data, but September 2008 was likely one of the highest months ever for precipitation with 11.28 inches for the month. Lansing ended up with the second highest September precipitation with 8.22 inches, second to only September 1986 with 8.34 inches. Grand Rapids also had the second highest September precipitation with 9.54 inches, second only to 1986 when 11.85 inches fell.

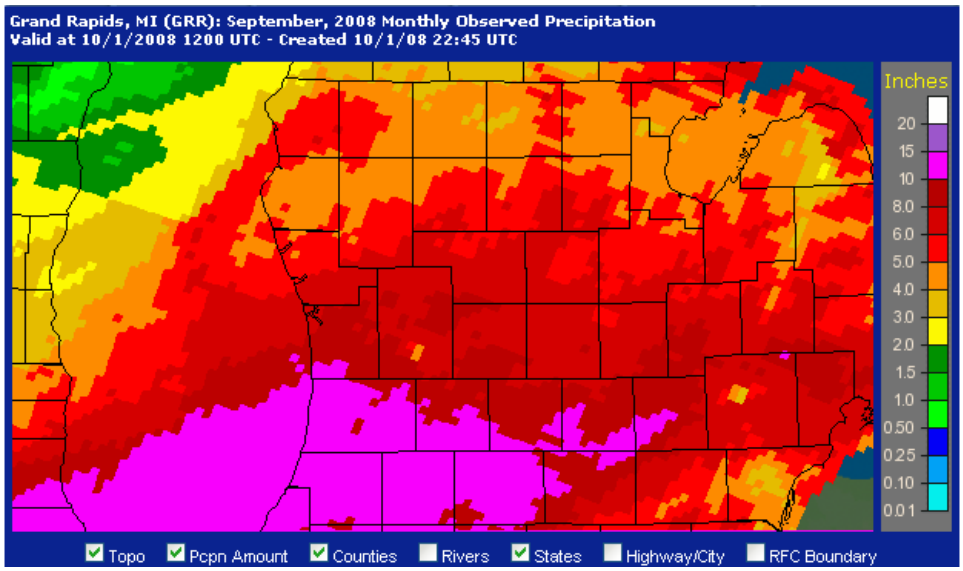

Figure 5. Doppler radar estimate for the month of September

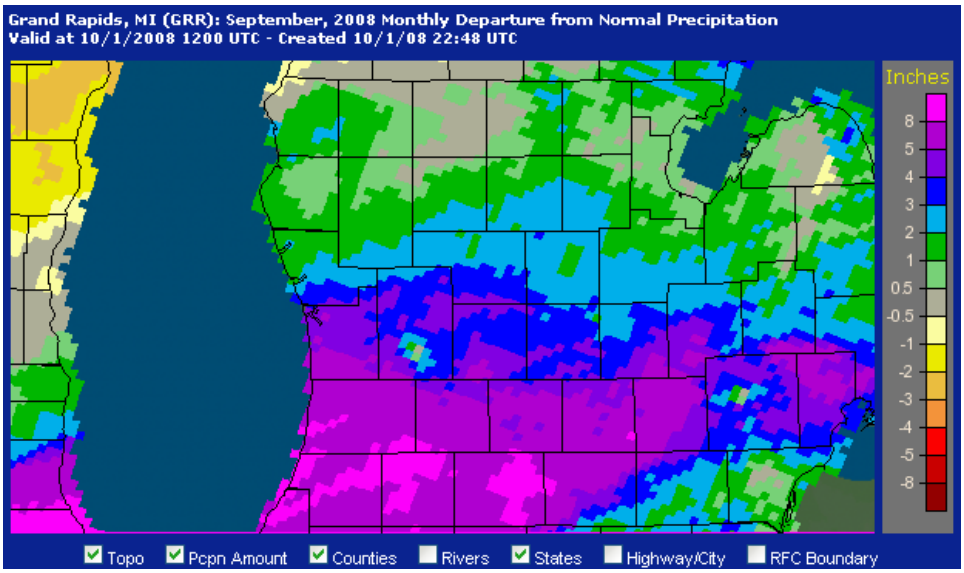

Figure 6. Precipitation departure from normal for the month of September

While the rainfall took most of the headlines for September of 2008 across Southwest Lower Michigan, September 2008 was a warmer than normal month. Muskegon, Grand Rapids, and Lansing all averaged 3 degrees above normal for the month. Most of the month was above normal, with the only cool portion of the month from the 4th through the 10th. The period from the 17th through the 29th was the warmest part of the month, where temps averaged around 6 degrees above normal for the period.

September 2008 Southwest Michigan Climate Data

Location		Temperature (degrees F)	Precipitation (inches)	Snowfall (inches)
Grand Rapids	*Reported*	64.7	9.54	0.0
	Normal	61.3	4.28	0.0
	Departure	+3.4	+5.26	0.0
Lansing	*Reported*	63.4	8.22	0.0
	Normal	60.5	3.48	0.0
	Departure	+2.9	+4.74	0.0
Muskegon	*Reported*	63.3	6.71	0.0
	Normal	60.5	3.52	0.0
	Departure	+2.8	+3.19	0.0

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Table 1. Temperature, precipitation, and snowfall totals and averages for September 2008.

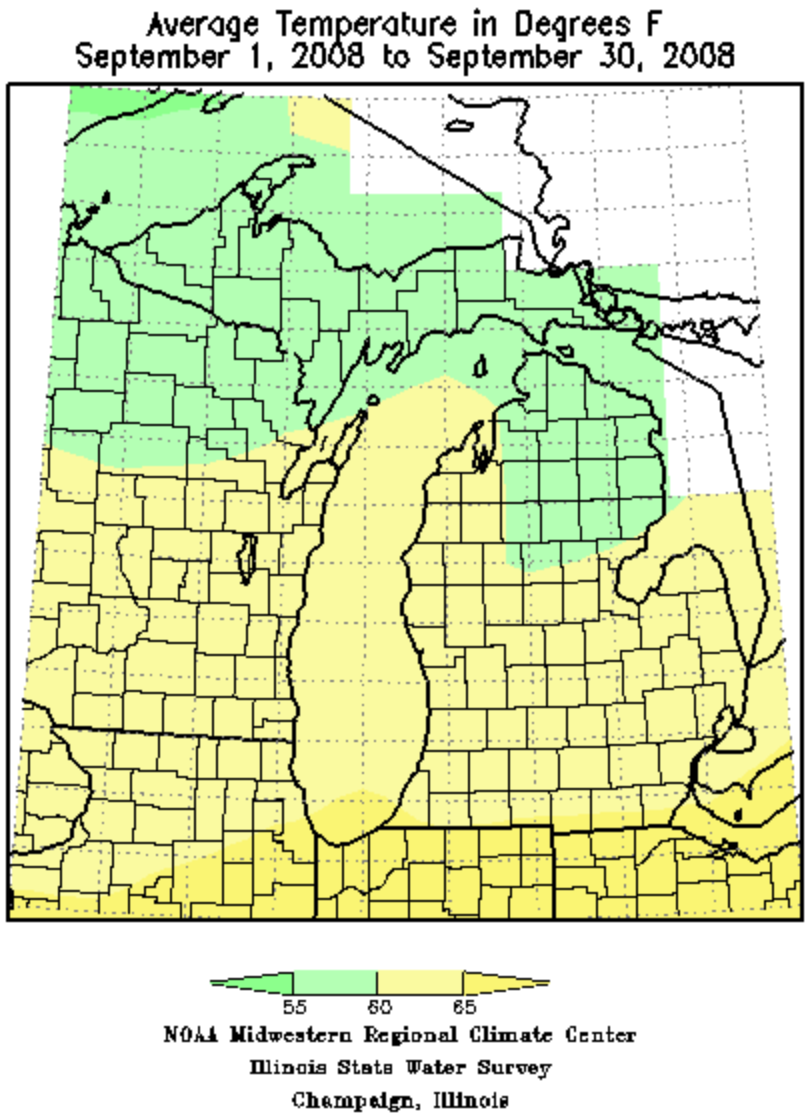

Figure 7. Michigan Average Temperature for September 2008

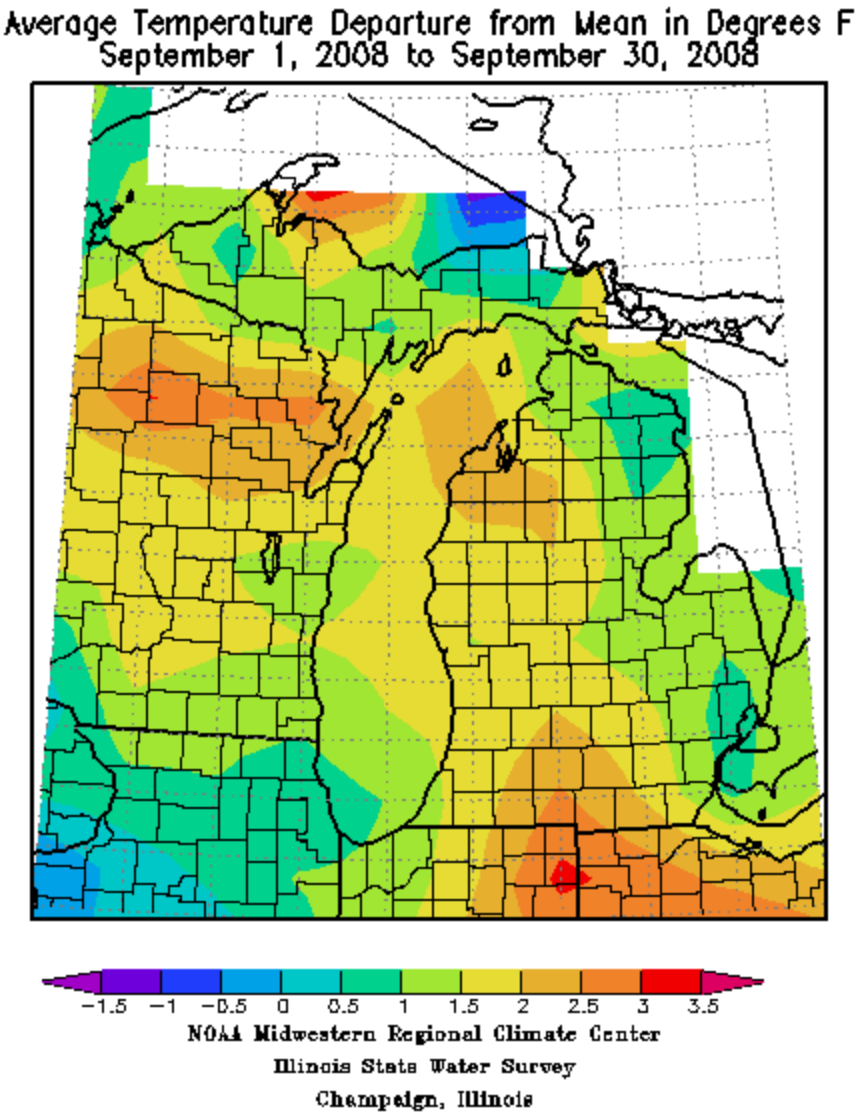

Figure 8. Michigan Temperature Departure from the Mean for September 2008